

OSS Development for the ESP8266 & Azure

Ivan R Judson



@irjudson

Rita Zhang



@ritazzhang

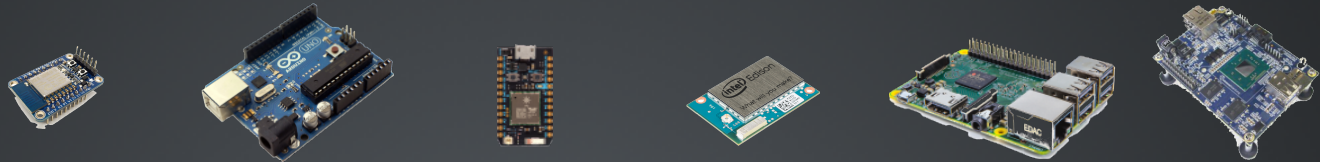
Pamela Cortez



@hello_techie

Introduction

Little Brain <=> Big Brain



	ESP8266	Arduino Uno	Particle Photon	Intel Edison	Raspberry Pi 2	MBM
Microcontroller	32-bit RISC, 80MHz	ATmega328	ARM Cortex-M3 (120 MHz)	Intel Atom	-	-
Microprocessor	-	-	-	Intel Quark	ARM Cortex A7 (Quad core, 900 MHz)	Intel Atom E38x (Dual Core, 1.33 GHz)
GPU	-	-	-	-	Y	Integrated
ADC	10-bit, 1-ch	10-bit, 6-ch	12-bit, 8-ch	-	-	-
Memory	512k - 4Mb Flash	32k Flash	1Mb Flash	1GB RAM + 4GB eMMC	1 GB RAM	2GB RAM
Wi-Fi SoC	Y	-	Y	Y + BT4	-	-
Linux	-	-	-	Y	Y	Y
Android	-	-	-	-	-	Y
Windows 10 IoT	-	-	-	-	Y	Y
Cost	\$2 - \$15	\$30	\$19	\$80	\$42	\$140

IoT @ Microsoft

Client

- Windows IoT Core
- Open & Closed Tools
- Open & Closed Libraries

Cloud

- IoT Platform
 - On Azure Foundation
 - PaaS Components
- Solution Templates
 - Remote Monitoring
 - "SaaS" - like

Platform Services

Security & Management

- Portal
- Active Directory
- Multi-Factor Authentication
- Automation
- Key Vault
- Store / Marketplace
- VM Image Gallery & VM Depot

Compute

- Cloud Services
- Service Fabric
- Batch
- Remote App

Web and Mobile

- Web Apps
- API Apps
- API Management
- Mobile Apps
- Logic Apps
- Notification Hubs

Developer Services

- Visual Studio
- Azure SDK
- Team Project
- Application Insights

Hybrid Operations

- Azure AD Connect Health
- AD Privileged Identity Management
- Backup
- Operational Insights
- Import/Export
- Site Recovery
- StorSimple

Integration

- Storage Queues
- Biztalk Services
- Hybrid Connections
- Service Bus

Analytics & IoT

- HDInsight
- Machine Learning
- Data Factory
- Event Hubs
- Stream Analytics
- Mobile Engagement

Data

- SQL Database
- SQL Data Warehouse
- Redis Cache
- Search
- DocumentDB
- Tables

Media & CDN

- Media Services
- Content Delivery Network (CDN)

Infrastructure Services

Compute

- Virtual Machines
- Containers

Storage

- BLOB Storage
- Azure Files
- Premium Storage

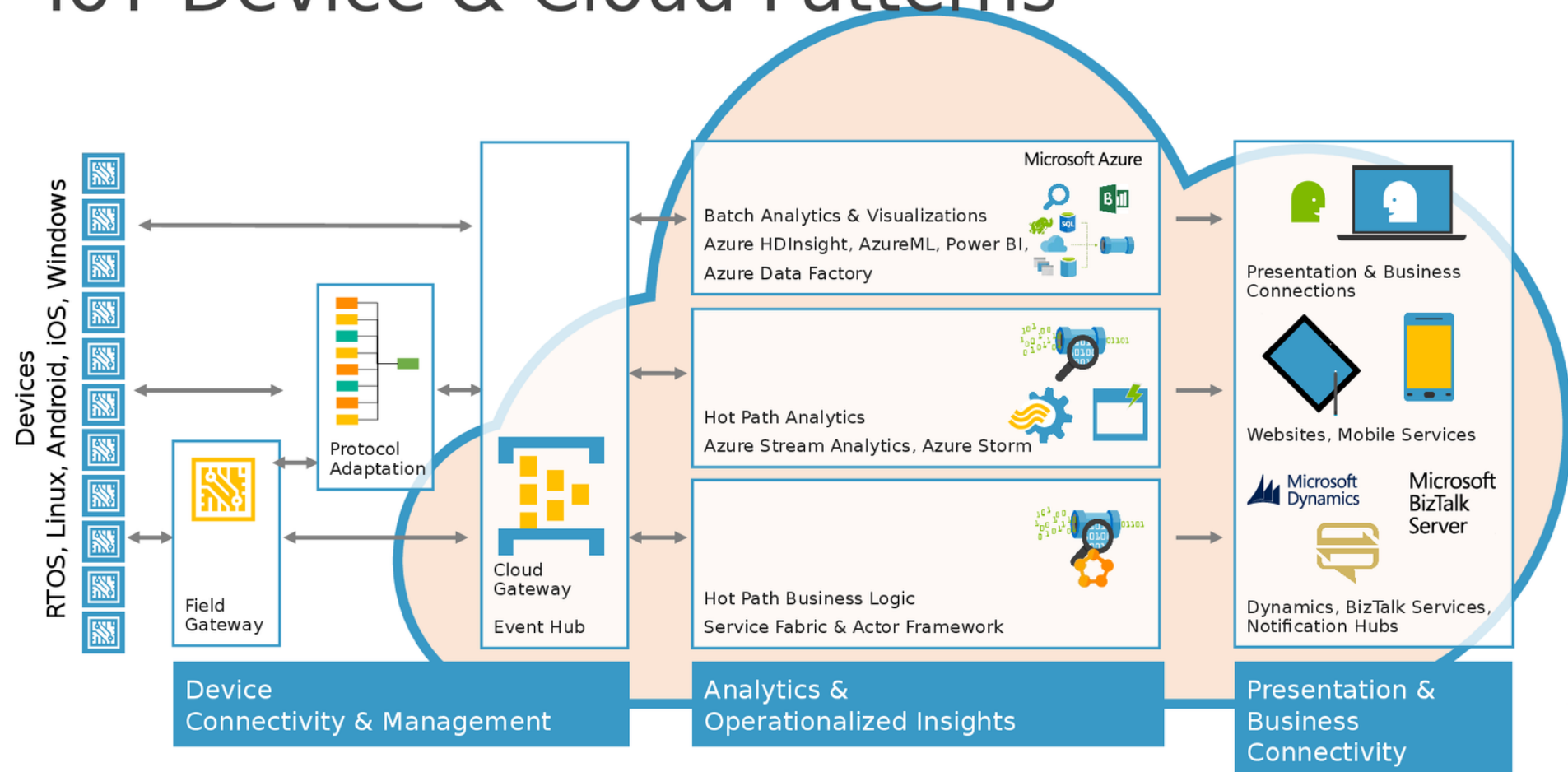
Networking

- Virtual Network
- Load Balancer
- DNS
- Express Route
- Traffic Manager
- VPN Gateway
- Application Gateway

Datacenter Infrastructure

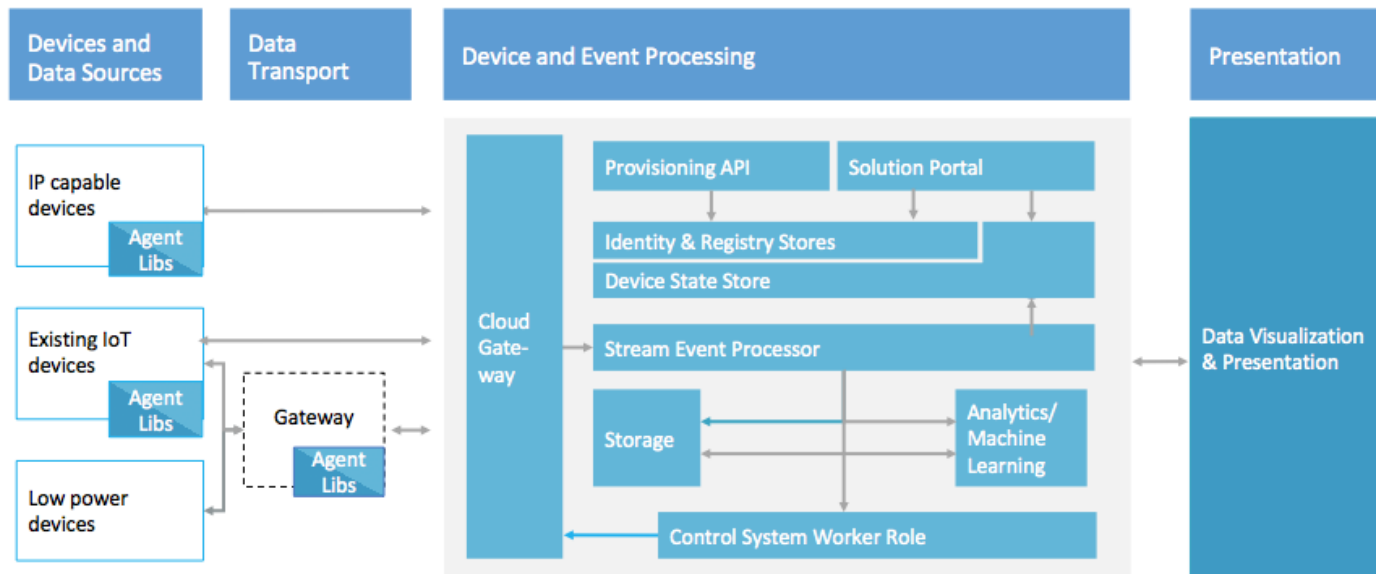


IoT Device & Cloud Patterns



Azure IoT

Azure IoT Reference Architecture



Azure IoT: Software

[Pull requests](#) [Issues](#) [Gist](#)

Search

org:Azure azure-iot

Search

Repositories

28

<> Code

126

! Issues

835

📖 Wikis

7

👤 Users

Languages

C#

9

JavaScript

5

TypeScript

5

C

3

C++

2

[Advanced search](#)

[Cheat sheet](#)

We've found 28 repository results

Sort: Best match ▾

[Azure/azure-iot-sdks](#)

JavaScript

★ 358

🔗 487

SDKs for a variety of languages and platforms that help connect devices to Microsoft **Azure IoT** services

Updated 4 hours ago

[Azure/azure-iot-remote-monitoring](#)

C#

★ 120

🔗 125

Azure IoT Remote Monitoring preconfigured solution

Updated 2 hours ago

[Azure/azure-iot-protocol-gateway](#)

C#

★ 81

🔗 51

Azure IoT protocol gateway enables protocol translation for **Azure IoT** Hub

Updated 5 days ago

[Azure/azure-iot-gateway-sdk](#)

C++

★ 64

🔗 43

Azure IoT Gateway SDK

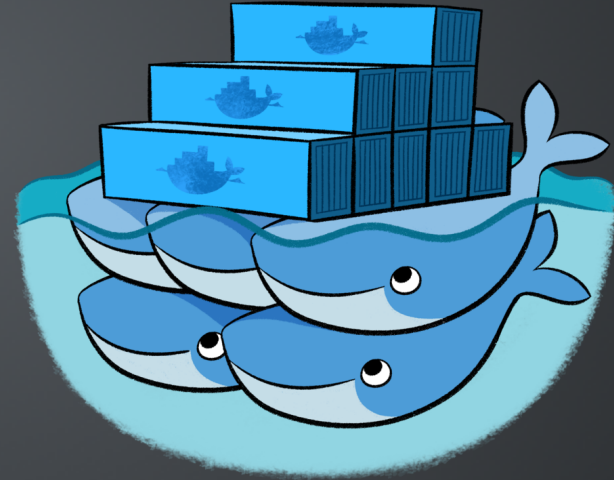
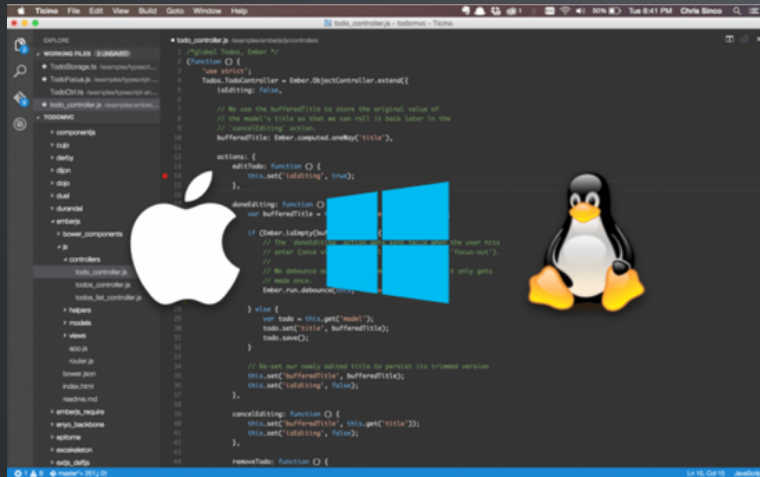
Updated 10 hours ago

Developer Experience



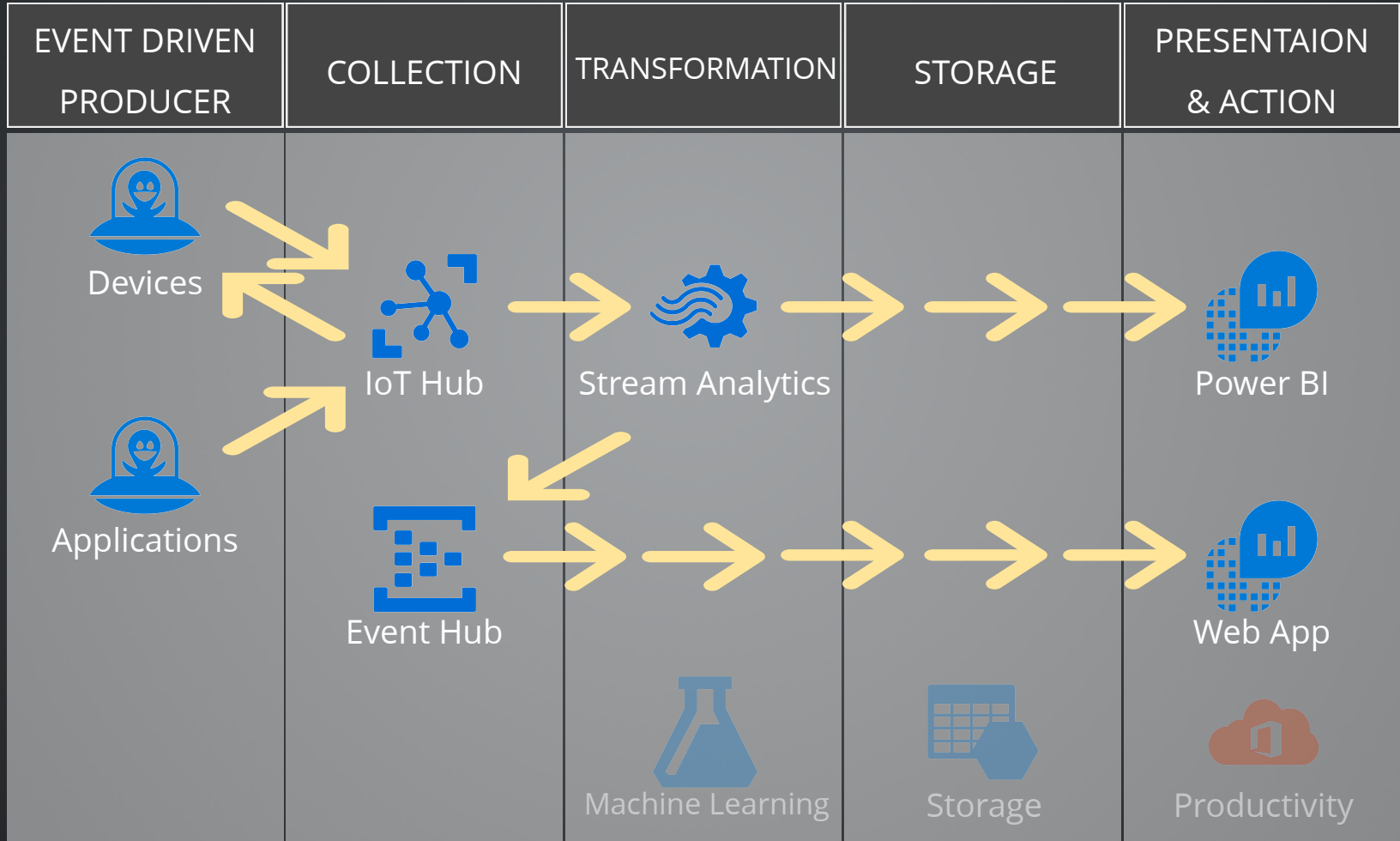
...but we also support C#

Open Source Toolchain



A Complete Solution

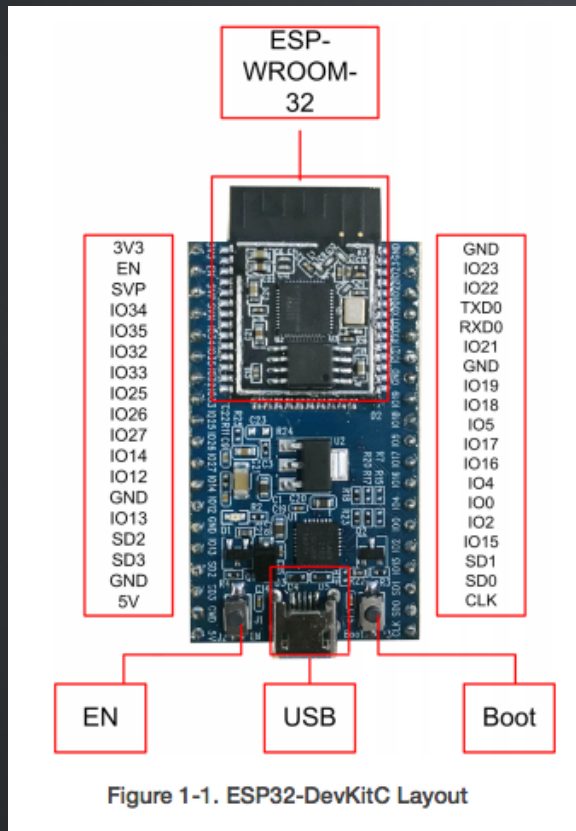
Workshop Goals



Demo

ESP8266

ESP32



Partnerships



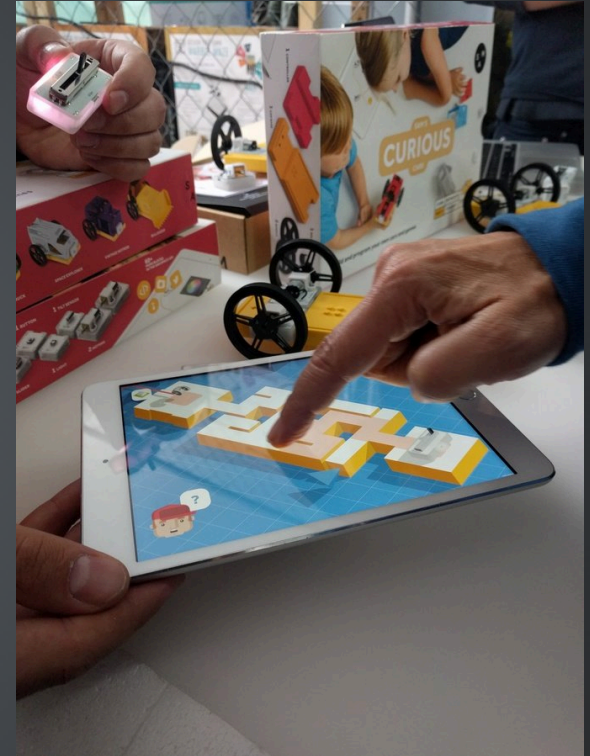
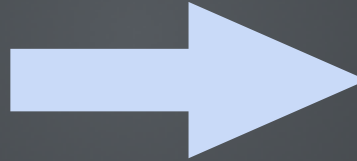
Adafruit is ranked #11 in the top 20 USA manufacturing companies and #1 in New York City by Inc. 5000 "fastest growing private companies."

[illegible]

- Easy to get started
- Open Source Hardware
- Example Code and Libraries all on GitHub
- Great to prototyping for both Makers and R&D

From Idea to Product

SAM Labs was incubated in
Microsoft's London Accelerator.



Outreach

ConstructAR - The Holographic Tool Belt

Made by TEAM ConstructAR (Ron Dagdag) - Published in [Hackster Dallas - Fort Worth](#), [Hackster Live](#), [Johnny-Five](#), [littleBits](#), [Microsoft](#), [Oculus](#), [Unity](#), and [Virtual Reality](#)



ABOUT THIS PROJECT

In Hololens, overlay as-built BIM model over Real World. Turn on/off content. IoT Integration for temperature, light switch and fan switch.

📌 mixed reality 📌 augmented reality

📌 home automation

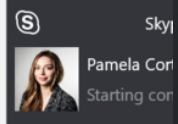
PROJECT INFO

Type Full instructions provided

Difficulty **Advanced**

Published June 30, 2016

License [GPL3+](#)

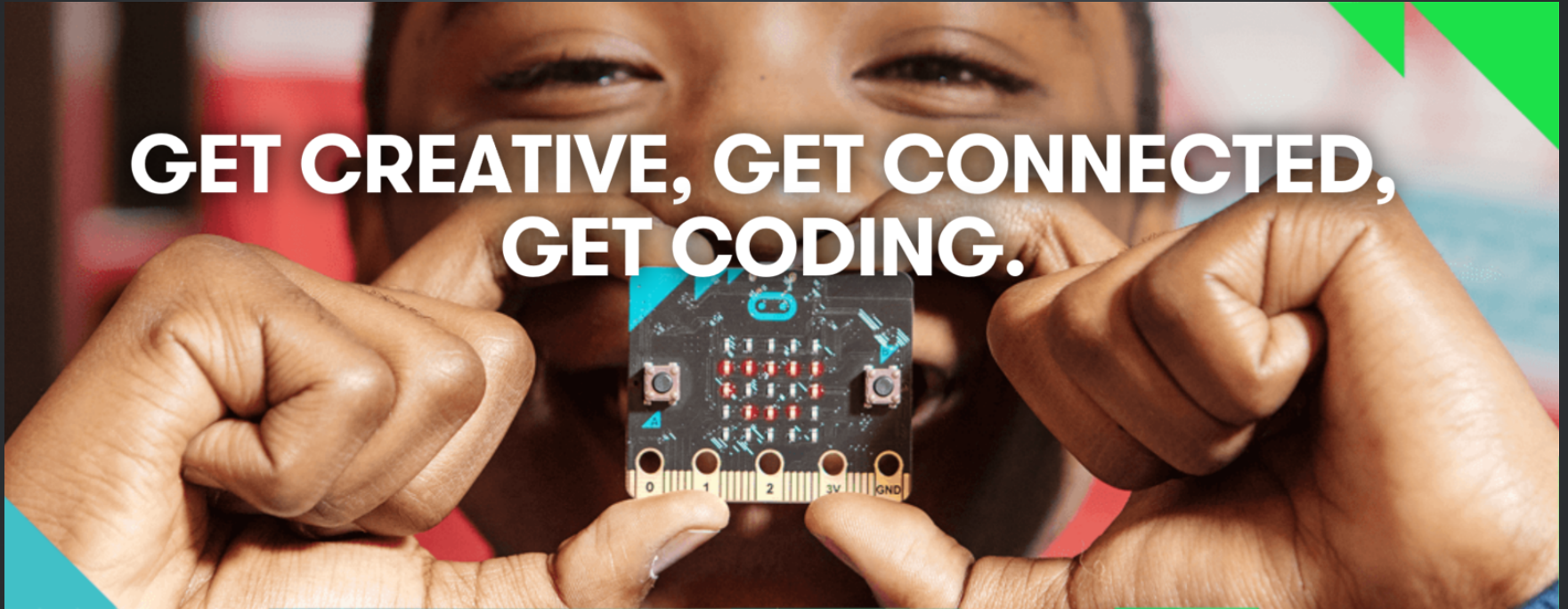


👁 2,094 👍 30



Open Source HW/SW + EDU

**GET CREATIVE, GET CONNECTED,
GET CODING.**



<https://www.microbit.co.uk/>
pxt.io (programming experiences toolkit)

Go Hack!

Ivan R Judson @irjudson

ivan.judson@microsoft.com

Rita Zhang @ritazzhang

ritazh@microsoft.com

Pamela Cortez @hello_techie

pacorte@microsoft.com



Resources

- Azure IoT SDKs
 - <https://github.com/Azure/azure-iot-sdks>
- ESP8266
 - https://github.com/espressif/ESP8266_RTOS_SDK
- ESP32
 - <https://espressif.com/en/products/hardware/esp32/overview>
 - <https://github.com/espressif/esp-idf>
 - <https://ritazh.com/get-started-with-esp32-785a111476f2>
- ThingLabs ESP8266 workshop
 - <http://thinglabs.io/workshop/esp8266/>
- VSCode
 - <https://code.visualstudio.com>
- Docker Image for ESP
 - <https://hub.docker.com/r/vowstar/esp8266/>